INTELLIGENT PARKING SYSTEM

By

YOUR NAME HERE

A MINI PROJECT REPORT

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Of

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION TO IOT

The **Internet of Things (IoT)** is the network of physical devices, vehicles, home appliances and other items embedded with electronics, software, sensors, actuators, and connectivity which enables these objects to connect and exchange data. Each thing is uniquely identifiable through its embedded computing system but is able to inter-operate within the existing Internet infrastructure.

The IoT allows objects to be sensed or controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit in addition to reduced human intervention. These devices collect useful data with the help of various existing technologies and then autonomously flow the data between other devices.

1.2 INTRODUCTION TO INTELLIGENT PARKING SYSTEM

The aim of this prototype is to propose a design of an Automated Parking System(APS) commanded by an application that regulates the number of vehicles to be parked on designated parking area by automating the Parking and Unparking of the vehicles . Our proposed APS would be less human dependent as possible by automating the vehicles. This APS is an interesting prototype which uses LCD to display the information about the total number of vehicles that can be parked and the place free for parking.

1.3 PROBLEM DEFINITION

Keeping track of the parking slots during peak hours may be challenging for the people and the inability to find the parking slots may result in traffic congestion. Therefore, we need an automated parking system which overcomes such disadvantages.

Most of the existing system aren't completely automated and it requires certain level of human interference or interaction in or with the device.

The APS is an interesting prototype which uses LCD to display the information about the total number of vehicles that can be parked and the place free for parking. Two radio frequency sensors are used in this prototype to identify the entry or exit of the cars into/out of parking area.

CHAPTER 2

LITERATURE SURVEY

2.1 EXISTING SYSTEM

The features in existing system are:

Various methods are prevalent for development of autonomous or intelligent parking systems. Study of these systems shows that these require a little or more human intervention for the functioning. One of the intelligent systems for car parking has been proposed by making use of image processing.

2.1.1 Disadvantages of existing system

The disadvantages of the existing system are:

The existing model does not give any notification at a particular time for the driver to park the vehicle at a vacant area.

It does not send any area if any slots are vacant.

2.2RELATED WORK

1. AN LED GLOW SYSTEM

Car parking systems does not have any intelligent monitoring system. Parking lots are monitored by human beings. All vehicles enter into the parking and waste time for searching for parking slot. Sometimes it creates blockage.

Condition become worse when there are multiple parking lanes and each lane have multiple parking slots. Use of automated system for car parking monitoring will reduce the human efforts. Display unit is installed on entrance of parking lot which will show LEDs for all Parking slot and for all parking lanes. Empty slot is indicated by the respective glowing LED.

II. AUTOMATED PARKING SLOT

Automated Parking slot helps in the regulation of any parking slot with the large number of vehicle involved. This project concentrates on less manpower utilisation, less installation and maintenance cost. This project is a versatile project which can be implemented on any condition and location. This is a conceptual project and just a prototype was designed and hence can go through the various stages of modification to make it reliable and much more suitable for the real time applications. I. Introduction As the automobile industry is growing day by day hence the large number of vehicles are produced and used by the common people. So as the number of vehicle increases it becomes much more complicated to regulate these vehicles. Whenthey are to be parked hence we have designed this project to make the parking system much simpler and automated in order to provide automated parking slot. This project can be implemented in various kinds of situation and places. Such as schools, shopping malls etc.With less requirement of maintenance for better functionality of the parking slot. This slot has a various part such as entry gate, exit gate, vehicle counter and a display system and a safe parking mechanism.

III. SOLID WORKS AND CONTROL ALGORITHMS

Anthony Martin & Jose Mendoza [4] explains In constructing the parking system for a student project activity, the proposed design was done using SolidWorks and the control Algorithms have been done using MATLAB/SIMULINK. one servo (Motor1) motor and two stepper motors including rotating system motor (Motor2, Motor3), and two Ultrasonic sensors for the distance measurements and signal processing for opening the first gate and to order the stepper motor to run and lift the car. The two stepper motors are at the top, to allow for prismatic movement of the care and lift and other to rotate the whole structure; there is one servo motor at the first gate waiting the cutting signal from the first Ultrasonic sensor.

CHAPTER 3

SYSTEM REQUIREMENT SPECIFICATION

3.1 SYSTEM REQUIREMENTS

3.1.1 Software Requirements

Environment : Arduino

Browser : Chrome, Mozilla Firefox

Operating System : Windows 8 or higher

3.1.2 Hardware Requirements

Sensor : IR sensor

Micro Controller : Arduino Uno

Motor driver l293D

LCD display

Device driver

DC Motor

3.2 SOFTWARE DESCRIPTION

3.2.1 Arduino Software (IDE)

The Arduino software (IDE) is an open source which makes it easy to write code and upload it to board. The environment is written in Java and based on processing and other open source software. The Arduino project provides the Arduino integrated development environment (IDE).The Arduino IDE supports the languages C and C++ using special rules of code structuring.

3.1.2 Arduino Projects

A minimal Arduino C/C++ program consist only two functions:

setup(): This function is called once when a sketch starts after power-up or reset. It is used to initialize variables, input and output pin modes, and other libraries needed in the sketch.

loop(): After setup() has been called, function loop() is executed repeatedly in the main program. It controls the board until the board is powered off or is reset.

3.1.3 Initial Setup

A new project can be created by clicking **File -> New** in the Arduino menu bar.

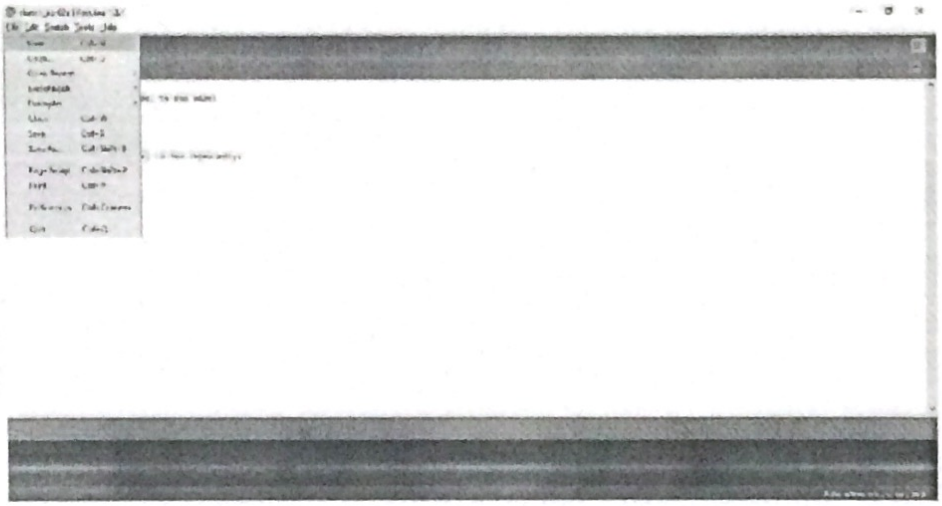


Fig 3.1 Creating a new arduino project

3.1.4 Compiling Sketch

The code is saved by clicking **File -> Save As**. The code is compiled by clicking **Sketch -> Verify/Compile**. If there are any errors, they will be

displayed at the bottom, and if the program is error free it can be uploaded to the board.

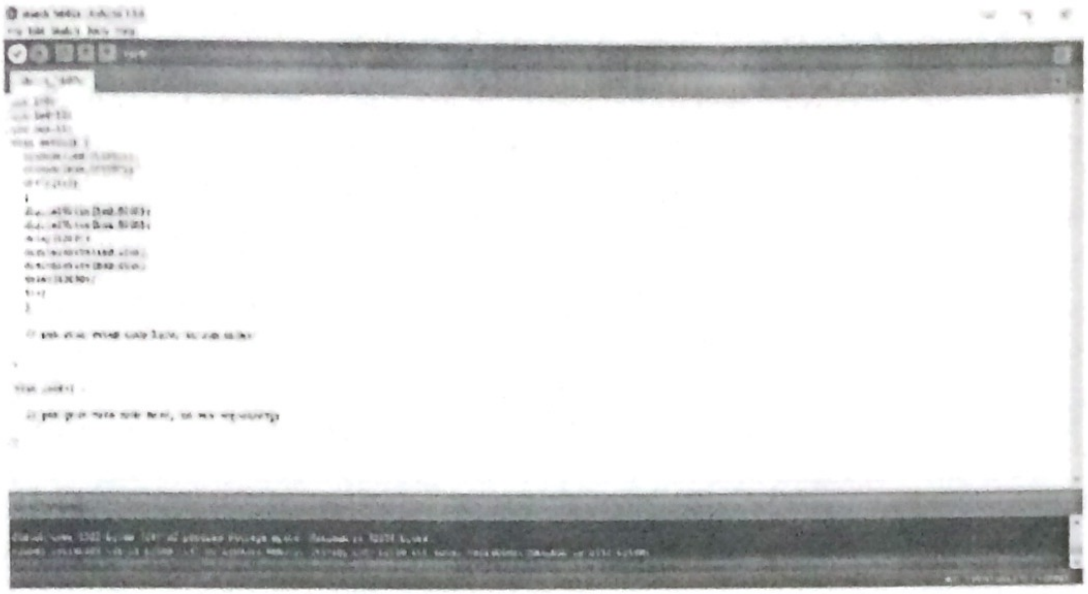
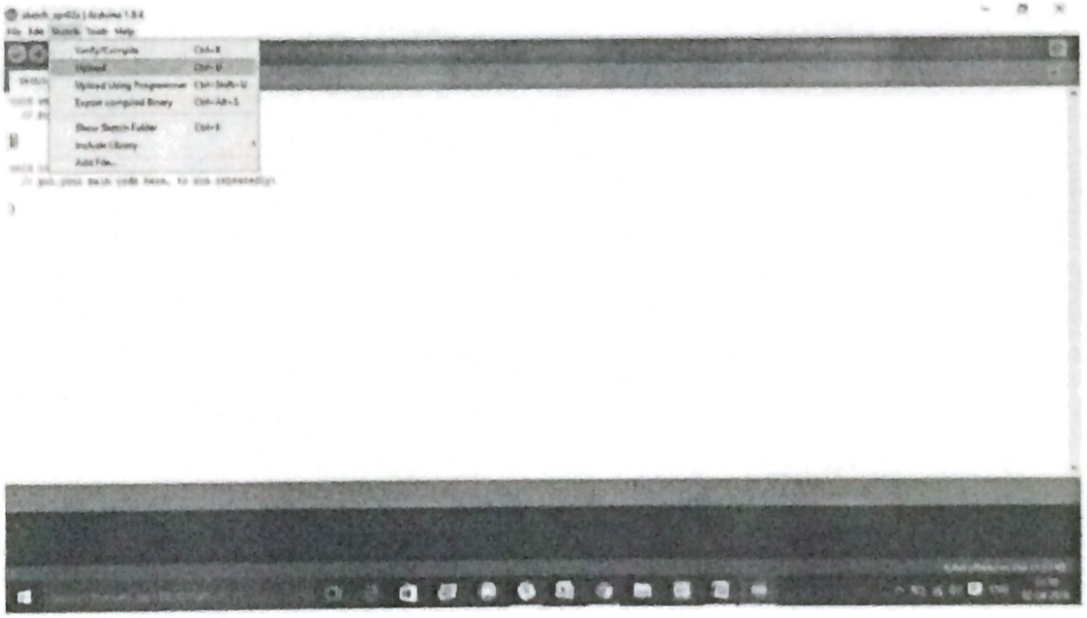


Fig 3.2 Compiling a sketch

3.1.5 Uploading Sketch

We check for errors in the code, and once they are fixed, we upload the code to the Arduino Microcontroller Board.



CHAPTER 4

PROJECT DESCRIPTION

4.1 PROPOSED SYSTEM

The aim of this prototype is to propose a design of an Automated Parking tem(APS) commanded by an application that regulates the number of vehicles to be parked designated parking area by automating the Parking and Unparking of the vehicles . Most of existing system aren't completely automated and it requires certain level of human rference or interaction in or with the devices. Our proposed APS would be less human ndent as possible by automating the vehicles.

This APS is an interesting prototype which uses LCD to display the information bout the total number of vehicles that can be parked and the place free for parking. Two radio equency sensors are used in this prototype to identify the entry or exit of the cars into/out of arking area. These two RF sensors are arranged in an alternate fashion across the road enever the mains are switched on , the LCD displays the maximum limit of parking vehicles the parking area .

The automatic opening and closing of gate is controlled by RF sensors and the microcontroller ynamically updates the value of count and displays it on LCD. If the count becomes 0,it display it as vacant. .If the time taken by the vehicle falls below the average calculated time t will detects it as over speed and report the vehicles of the offenders to the personal. The RF sensors last for long duration due to low power consumption and it has good ability over time.

4.2 BLOCK DIAGRAM

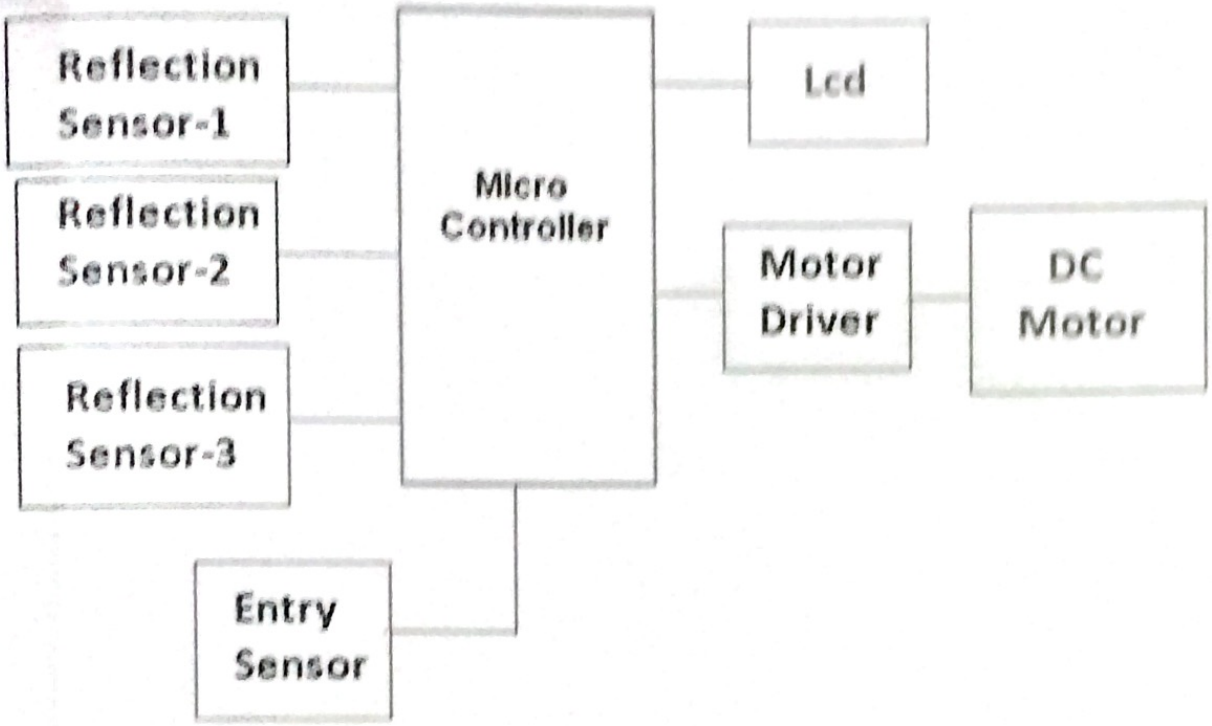


Fig 4.1 Block diagram of intelligent parking system

4.3 SYSTEM ARCHITECTURE

This architecture represents the design of intelligent parking system di in which IR sensor is main part of IPS. There are two types of notifications used, LCD display to indicate the number of vehicles in the parking area and another LCD display which indicates the number of vehicles leaving the parking area.

Fig 4.2 IPS Architecture

4.4 SYSTEM MODULES

4.4.1 BEFORE ENTERING THE PARKING AREA

The LCD display near the gate shows the number of vehicles inside the parking area. Depending on the number of vehicles inside the parking area, the vehicle can either enter or leave the parking area.

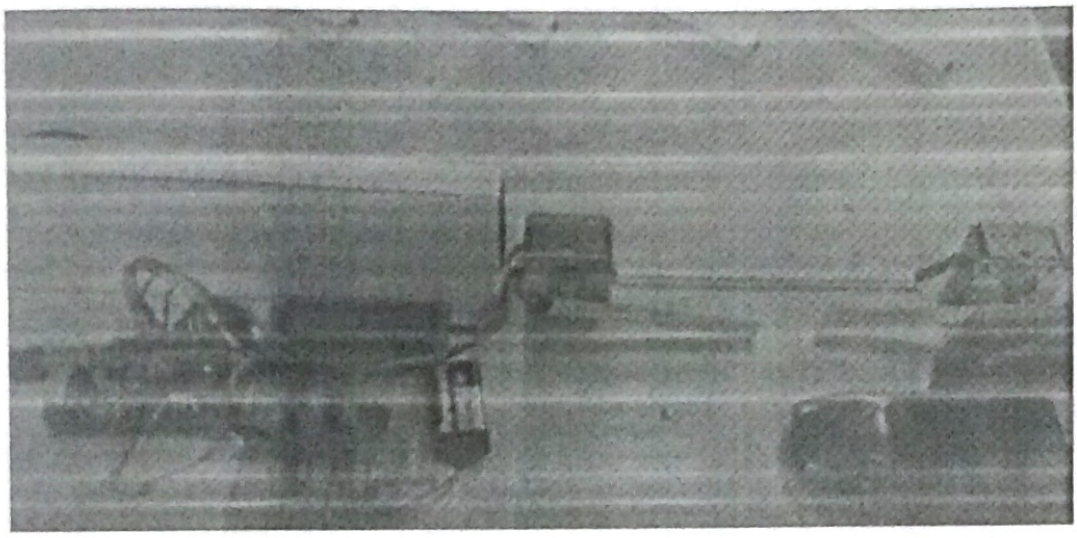


Fig 4.3 Before entering the parking area

4.4.2 WHILE ENTERING THE PARKING AREA

The IR sensor placed near the gate senses the incoming vehicle. After the vehicle is detected, the gate which is controlled by the DC motor opens and the vehicle enters the parking area.

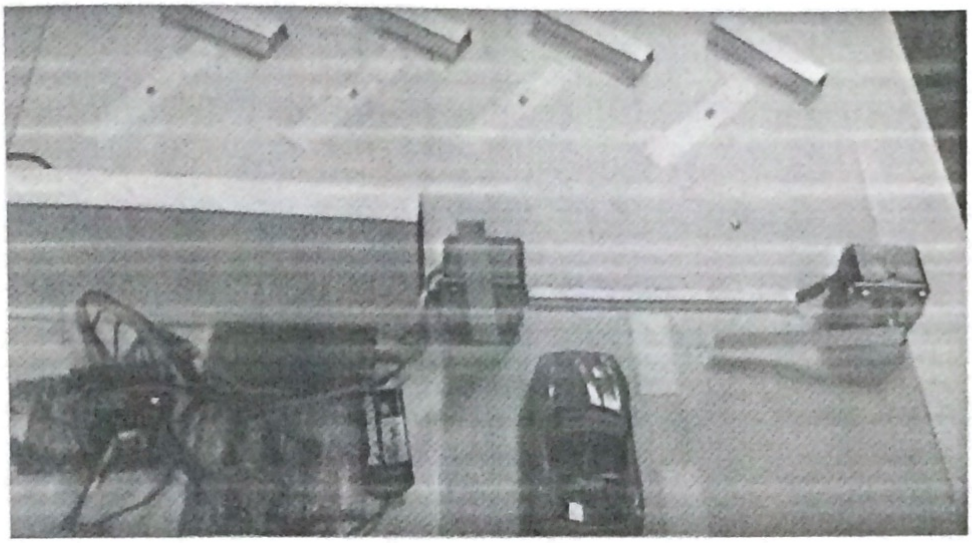


Fig 4.4 While entering the parking area

4.4.3 AFTER ENTERING THE PARKING AREA

After entering into the parking area, the vechicle is parked in the vacant slot. The vehicle parked is sensed by the IR sensor which is embedded in the parking slot. This increments the count value which is visible in the LCD display.

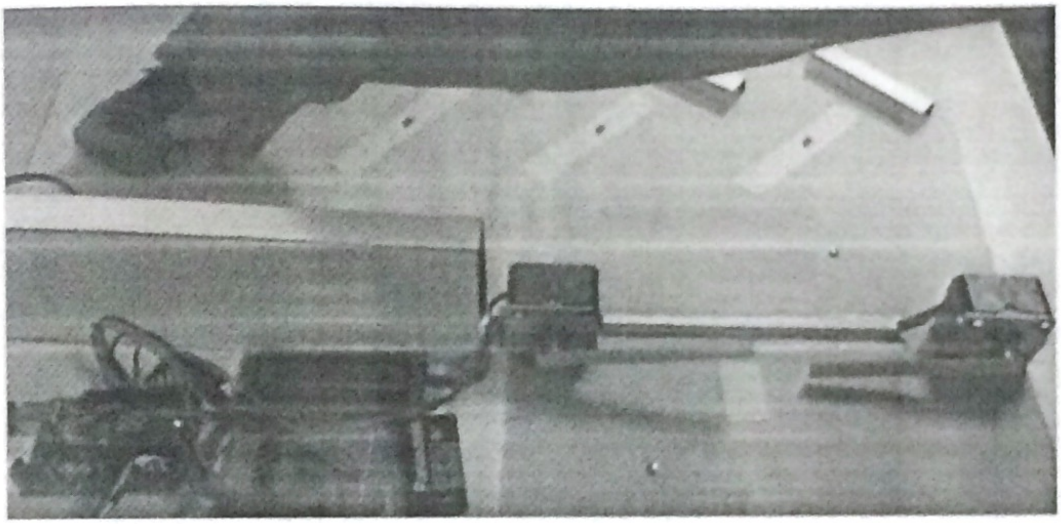


Fig 4.5 After entering the parking area

4.4 CODING:

```
#include <LiquidCrystal.h>
LiquidCrystal lcd (12,11,5,4,3,2);
int IR_1 = 5; //exit
int IR_2 = 4; //enter
int counter=0;
int currentState=0;
int previousState_1=0;
int previousState_2=0;
int IR_1_op;
int IR_2_op;
void setup() {
 // put your setup code here, to run once:
Serial.begin (9600);
pinMode(IR_1,INPUT);
pinMode(IR_2,INPUT);
lcd.begin (16,2);
}

void loop() {
 // put your main code here, to run repeatedly:

lcd.setCursor (0,0);
lcd.print("IOT PARKING");
lcd.print ("NO.OF CARS:");
lcd.setCursor (0,1);
lcd.print ("CAR");
IR_1_op = digitalRead(IR_1);
IR_2_op = digitalRead(IR_2);
Serial.println(digitalRead(IR_2));
if (IR_1_op == HIGH && IR_2_op == LOW)
{
 currentState=1;
}
else
{
 currentState=0;
}
if(currentState!=previousState_1)
{
 if(currentState==1)
 {
  counter=counter+1;
  lcd.setCursor(13,0);
  lcd.print(counter);
   lcd.setCursor(4,1);
```

```
lcd.print("ENTER");
  }
}
 previousState_1=currentState;
 delay (250);
Serial.println(counter);
if (IR_1_op == LOW && IR_2_op == HIGH)
{
currentState=1;
}
else
{
 currentState=0;
}
if(currentState!=previousState_2)
{
 if(currentState==1)
  {
   counter=counter-1;
   lcd.setCursor(13,0);
   lcd.print(counter);
    lcd.setCursor(4,1);
   lcd.print("full");
  }
}
 previousState_2=currentState;
 delay (250);
Serial.println(counter);
}
```

Fig 4.7 Code to sense the vehicle

CHAPTER 5

CONCLUSION AND FUTURE ENHANCEMENTS

5.1 CONCLUSION:

We have proposed this project as it tells in prior regarding the availability of parking area. Most often people randomly park the vehicles in streets. A proper parking system is necessary to provide ease to park the vehicles .With the help of our project we aim to tackle the problem of parking issues. The goal of the intelligent parking system is to overcome the problems of existing parking systems such as their inconvenience, Low reliability and communication inefficiency. The intelligent parking system works for all vehicles rather than two wheelers. The proposed system has high degree of scalability, remote manageability and cost efficiency. The IR sensors last for long duration due to low power consumption and it has good stability over time. It can detect both in day and night time irrespective of climatic condition. oxidation or corrosion of IR sensor do not affect the accuracy of detection

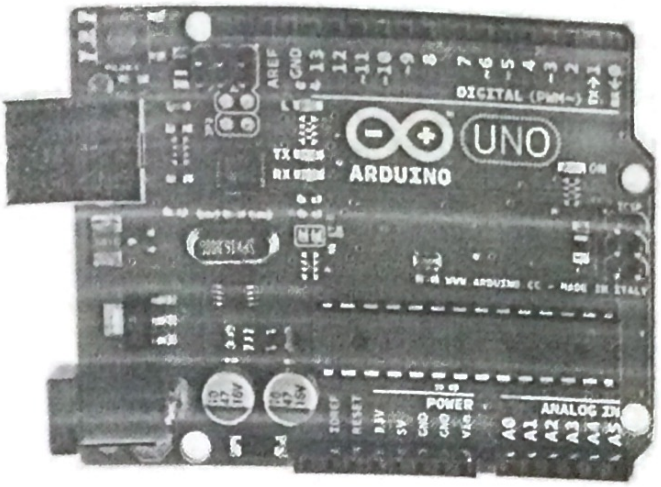
5.2 FUTURE WORK:

Many features can be added to the system to improve its user friendliness and effectiveness.

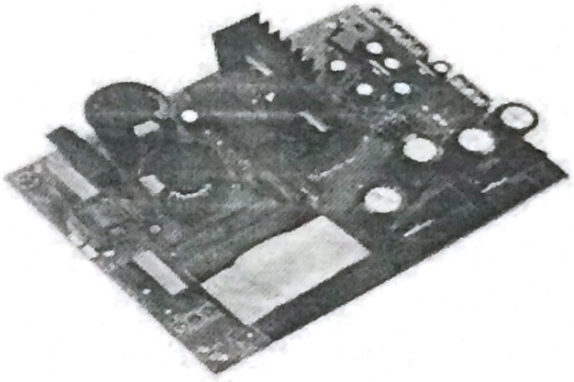
1. This can be expanded in the sense of security. Using metal detectors and CCTV cameras, security of the parking area can be enhanced.

2. In future, this system or technique will be the one which is used in every industries and even in household apartments.

APPENDIX - 1

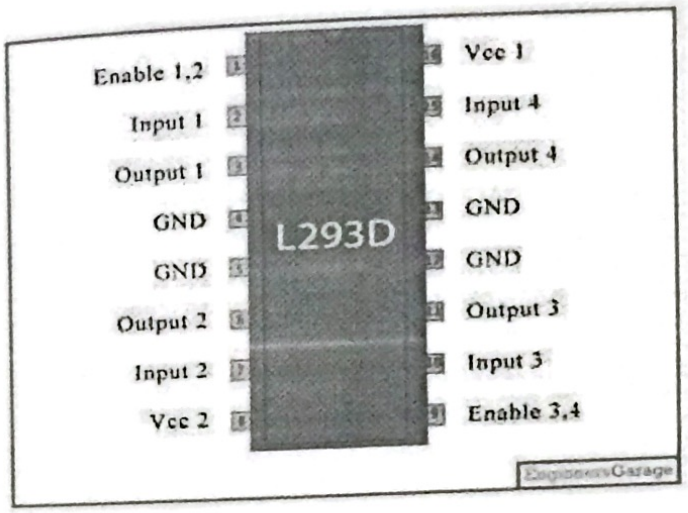


Arduino Uno

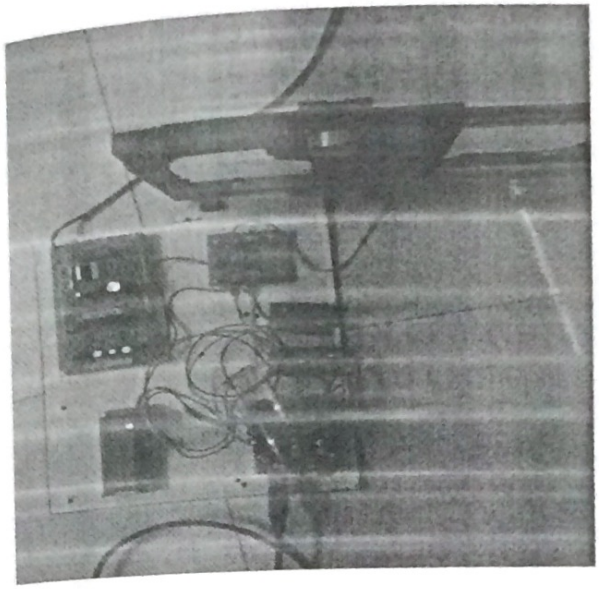


Power supply board

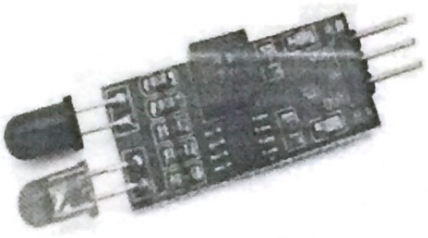
DC motor



MOTOR DRIVER L293D



Interfacing IR sensor and LCD display



IR sensor

REFERENCES:

1. 'International Journal of Advanced Research in Electronics And Communication Engineering' - http://ijarece.org.

2. "Cars, Parking and Sustainability"- Sanders McDonald, Shannon.

3. 'The IEEE Journals' - ieeexplore.ieee.org.

4. 'The intelligent parking system '- https://www.ncbi.nlm.nih.gov/ips/articles/PMC3412374/

5. Maya & Jon – 'automatic parking system'

6. 'The automatic booking' – https://armartin891.wordpress.com/2014/05/08/final-project-report-the-friendly-slot-reminder/